

A study of depression and anxiety in cancer patients

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ABSTRACT

The aim of the study was to assess the prevalence of depression and anxiety in cancer patients. A cross sectional case control study design was used. Severely or terminally ill cancer patients and patients suffering from other concomitant illnesses were excluded from the study. Depression and anxiety was assessed on 50 cancer patients (cases) and on 50 healthy individuals (controls). The tools used were Structured Proforma (for recording socio-demographic details and relevant medical history), General Health Questionnaire (GHQ) and Hospital Anxiety and Depression Scale (HADS). A total of 30 (60.0%) were detected as 'cases' or having psychiatric morbidity based on a cutoff score of above 2 on 12 item GHQ. Depression was present in 28.0% of cancer patients whereas 40.0% of cancer patients had anxiety as per HADS.

Keywords: Depression, Anxiety, Cancer, GHQ, HADS.

INTRODUCTION

The word cancer still conjures up deep fears of a silent killer that creeps upon us without warning. Cancer evokes such desperation that it becomes a metaphor for grief and pain, a scourge straining our intellectual and emotional resources.

Despite recent advances in securing remission and possible cure, cancer still remains a disease equated with hopelessness, pain, fear and death. Its diagnosis and treatment often produces psychological stresses resulting from the actual symptoms of the disease, as well as patient's and family's perception of the disease. Patients have common fears, which have been called six Ds: death, dependency on family, spouse and physician; disfigurement and change in early appearance and self image, sometimes resulting in loss or changes in sexual functioning; disability interfering with achievement of age appropriate tasks in work, school or leisure roles; disruption of interpersonal relationships; and finally, discomfort or pain in later stages of illness.¹

Cancer is associated with significant psychosocial morbidity. Many researchers have reported that six mental disorders occur more frequently in cancer patients to warrant a detailed assessment and clinical intervention. Three represent direct reaction to illness: adjustment disorders with depression and/or anxiety, major depression and delirium. Others (primarily anxiety disorders, personality disorders and major depressive disorders) are pre existing conditions often exacerbated by the illness.^{2,3}

In the new millennium, a significant base of literature, training programmes, and a broad research agenda has

evolved with applications at all points on the cancer continuum: behavioral research in changing lifestyles and habits to reduce cancer risk, study of behaviors and attitudes to ensure early detection; study of psychological issues related to cancer risks and testing; symptom control (anxiety, depression, delirium, pain, and fatigue) during active treatment; management of psychological sequelae in cancer survivor; and management of the psychological aspects of palliative and end of life care. Links between psychological and physiological domains of relevance to cancer risk and survival are being actively explored through psychoneuroimmunology. Research in these areas will occupy the research agenda for the first quarter of the new century. At the start of the third millennium, psycho oncology has come of age as one of the youngest subspecialties of oncology, as one of the most clearly defined subspecialties of consultation liaison psychiatry.⁴⁻⁶

Depression in cancer patients may results from (a) situational stress related to the cancer diagnosis and treatment (b) medications (steroids, interferon, or other chemotherapeutic agents) (c) a biologically determined depression (endogenous or major depression), which is not related to a precipitating event, or (d) recurrence of a bipolar mood disorder. The first two are the most common.¹ Though the exact etiology of depression in cancer is unknown, but several factors have been suggested including the emotional impact of a cancer diagnosis, side effects of treatment, progression of cancer with associated disability, and symptoms and cerebral dysfunction associated with carcinomatosis;⁷ disruption of key relationship, dependence, disability, disfigurement and approaching death.⁸

Table-1: Psychological test results

Test	Mean score of cancer patients	Mean score of controls	Mann Whitney test	Significance
GHQ	3.7	0.9800	487.5	0.000 (S)
ANXIETY	5.88	2.90	631.0	0.000 (S)
DEPRESSION	6.64	2.92	458.0	0.000 (S)

Additional risk factors specific for the development of depression in cancer patients include certain primary tumor sites, advanced disease state with declining physical status, and certain anticancer treatment methods including particular surgical procedures, chemotherapeutic regimens, and radiotherapy.⁹⁻¹³

Anxiety occurs in many patients with cancer varying from the “normal” worries and fears associated with a life threatening illness, through subsyndromal distress, adjustment disorders, and generalized anxiety disorders and anxiety due to the medical condition.^{14,15} The four common cause of anxiety in patients with cancer are as follows: (a) Situational: which includes diagnosis or illness relate crisis, conflict with family or staffs, anticipating a frightening procedure or test results, and fear of recurrence (b) Disease related: poorly controlled pain, abnormal metabolic states, hormone secreting tumors, paraneoplastic syndromes (remote central nervous system effects) (c) Treatment related: such as anxiety producing drugs (antiemetic, neuroleptic, bronchodilators), withdrawal states (opioids, benzodiazepines, and alcohol), conditioned (anticipatory) anxiety, nausea, and vomiting with cyclic chemotherapy and (d) Exacerbation of preexisting anxiety disorder: Phobias (needles, claustrophobia), Panic and generalized anxiety disorders, Post traumatic stress disorders or as a result of traumatic cancer treatments (eg. Bone marrow transplant).¹⁶ Most frequent is situational anxiety associated with hearing the diagnosis, or reaching a crisis in illness or treatment, during conflicts with staffs of family, anticipating a frightening procedure or a test result, and fear of recurrence. Disease related anxiety occurs most often with poorly controlled pain.

MATERIALS AND METHODS

The aim of the study was to assess psychiatric morbidity in cancer patients.

The objectives of the study were to: 1.) To study the prevalence of depression in cancer patients, 2.) To study the prevalence of anxiety in cancer patients

Materials used in the study: A structured proforma was used for recording socio-demographic profile and relevant medical history. All the 50 cancer patients and 50 controls (healthy individuals) were administered the

following psychological tests.

A. General Health Questionnaire (GHQ): GHQ is a screening instrument developed to assess the extent of non-psychotic psychiatric illness and current mental well being for the past few

weeks.¹⁷ It is extensively used in both community settings and general practice. This scale has been extensively validated over cultures, languages, age groups (except extremes of ages), gender and education with very high sensitivity and specificity. GHQ 12 was used in present study. Scoring was done by using binary method with 2 as cut off score.

B. Hospital Anxiety and Depression Scale (HADS): The HADS is a self-report questionnaire developed to detect adverse anxiety and depressive states.¹⁸ Since it was developed for use in non-psychiatric departments, it does not rely upon symptoms that may be present in people with physical illness alone, such as pain and weight loss. Subjects are asked to choose one response from the four given. They should give an immediate response and be dissuaded from thinking too long about their answers. The Questions relating to anxiety are marked ‘A’ and to depression ‘D’. It has 14 items, 7 related to anxiety and 7 to depression. Scoring is from 0-3 and score ranges from 0-56. The norms give an idea of the level of anxiety and depression (0-7=normal, 8-10=mild, 11-14= moderate and 15-21=severe).

Statistical Analysis: Frequency data were compared by using the ‘chi’ square test. Mann Whitney test was used for comparing the scores (between cancer patients and healthy individuals) on psychiatric rating scales. The differences were considered significant if the ‘p’ value was less than 0.05. Statistical analysis was done using SPSS.

RESULTS

The GHQ scores ranged from 0-11 in cancer patients with a mean value of 3.7 while that of controls ranged from 0-6 with a mean value of 0.9800. The mean anxiety score was 5.88 for cancer patients while those of controls were 2.90. Likewise, the mean depression score of cases was 6.64 while those of controls were 2.92. The

Table-2: GHQ score distribution of subjects

GHQ SCORES	CANCER PATIENTS	CONTROLS	
0	05	29	X ² = 18.72 OR=7.8 8p< 0.01 (S)
1-2	15	13	
> 2	30	08	
TOTAL	50	50	

Table-3: Distribution of depression scores of subjects

DEPRESSION SCORE	CANCER PATIENTS	CONTROLS	$X^2= 9$ $OR=9.33$ $p= < 0.01(S)$
0-7 (No Depression)	36	48	
8-10 (Mild)	04	00	
11-14 (Moderate)	08	02	
15-21 (Severe)	02	00	
TOTAL	50	50	

distribution of GHQ, depression and anxiety scores are presented in Table-2, 3 and 4 respectively.

Anxiety, as identified by HADS, was found in 20 (40.0%) of cancer patients. Out of 20 cancer patients with anxiety, 14 (28.0%) had mild anxiety and 6 (12.0%) had moderate anxiety. Depression, as identified by HADS, was found in 14 (28.0%) of cancer patients. Out of 14 cancer patients with depression, 4 (8.0%) had mild depression, 8 (16.0%) had moderate depression and 2 (4.0%) had severe depression.

Though a large number patient showed anxiety and depression, a clinical diagnosis using ICD 10 criteria could be given to 26% as against 4% of the control group (Table-5). The difference was statistically significant. Of the cancer patients who could be diagnosed, three had Depressive Disorder, one had Anxiety Disorder, five had Adjustment Disorder and four had Alcohol Dependence Syndrome.

DISCUSSION

General Health Questionnaire (GHQ): The GHQ scores ranged from 0-11 in cancer patients with a mean value of 3.7 while that of controls ranged from 0-6 with a mean value of 0.9800 (Table-1). We could conclude that significantly higher percentage of cancer patients (60.0%) had psychiatric morbidity as compared to healthy individuals (16.0%). GHQ scores distribution is presented in Table-2 and the difference was statistically significant ($p=<0.01$). The odd that cancer patients had psychiatric morbidity is nearly 8 times more than that of controls. A total of 30 (60.0%) were detected as ‘cases’ based on a cutoff score of above 2 on 12 item GHQ.

The observed GHQ ‘caseness’ were within ranges reported in literatures viz: Akechi *et al*¹⁹ – 65.0%, Iqbal *et al*² – 65.0%. But it was not consistent with reported prevalence of 47.0% by Derogatis *et al*.²⁰ In our study, the incidence of mental disorders among cancer patients was slightly higher (60.0%) as compared to study by Derogatis *et al*.²⁰ One possible explanation could be the attitude of patients towards their illness in our society. Due to lower literacy rate, people have a lot of misconceptions about cancer, such as cancer is incurable, cancer means death, etc. Even after getting necessary

and required information about the disease cancer and it’s treatment, they remain overanxious and uncertain about their treatment outcome and their ability to cope with the illness.² All the patients who were given a psychiatric diagnosis had abnormal scores on GHQ giving it a high sensitivity. Thus, GHQ –12 was found to be good screening instrument for psychiatric morbidity in cancer patients.

Depression: The depression score, in our study, ranged from 0 to 15 with a mean

value of 6.64 for the cases while those of controls ranged from 0 to 12 with a mean value of 2.92 (Table-1). Depression, as tested by HADS, was also found to be more in the cancer patients (28.0%) than the controls (4.0%). Depression score distribution is presented in Table-3 and was statistically significant ($p=<0.01$). The odd that cancer patients had depression is about 9 times greater than that of healthy individuals. Four (8.0%) patients had mild depression, eight (16.0%) had moderate depression and two (4.0%) had severe depression in the study. The distribution of depression (28.0%) in cancer patients, in this study, agrees with that pointed out by Razavi *et al*,²¹ Hosaka *et al*²² and Fulton.²³ Razavi *et al*²¹ reported a 25.5% of depression among the referred patients and a similar proportion is observed here. Hosaka *et al*²² reported depression to be seen in 28.0% of cancer patients.

Criteria for patient selection and methods of evaluation have influenced the variation in values obtained and that is why when comparing presently obtained figure of 28.0% of cancer patients showing depression, agreement is not obtained with studies by Kathol *et al*²⁴ – 19.0%, Berard *et al*²⁵ – 14.0%, Akechi *et al*²⁶ – 14.0%. This discrepancy, can be explained by the fact that different screening instruments (HRSD or and BDI) was used by Kathol *et al*.²⁴ They have reported diagnosis of depression differed as much as 13.0% depending upon the diagnosis system used. Furthermore, Berard *et al*²⁵ had initially used HADS and then the patients were subsequently subjected to BDI and then to structured psychiatric interview. This may be one reason for low estimates of depression on those studies.

Table-4: Distribution of anxiety scores of subjects

ANXIETY SCORE PATIENTS	CANCER	CONTROLS	$X^2= 16.84$ $OR = 16$ $p= < 0.01$ (S)
0-7 (No Anxiety)	30	48	
8-10 (Mild)	14	02	
11-14 (Moderate)	06	00	
15-21 (Severe)	00	00	
TOTAL	50	50	

Table-5: Psychiatric diagnosis as per ICD 10 of cancer patients and control

	CANCER PATIENTS(50)	CONTROL SUBJECTS(50)	$\chi^2= 7.84$ $p= <0.05(S)$
Depressive disorders	3	1	
Anxiety Disorders	1	0	
Adjustment disorder	5	0	
Alcohol dependence syndrome	4	1	

Anxiety: The mean anxiety scores, in our study, ranged from 0 to 13 in cases

with a mean value of 5.88 while those of controls ranged from 0-8 with a mean value of 2.90 (Table-1). Anxiety, as identified by HADS, was found in 40.0% of the cancer patients as against 4% for the control group. The difference was statistically significant ($p < 0.01$). Anxiety score distribution is presented in Table-4. The odd that cancer patients had anxiety is 16 times more than that of controls. Fourteen (28.0%) had mild anxiety, six (12.0%) had moderate anxiety and none had severe anxiety.

The distribution of anxiety in cancer patients (40.0%) agrees with that pointed out by Zeigler *et al*²⁷ who has also reported 40.0%, but differences are seen as pointed out by most of the other studies. Other studies have reported anxiety as follows: Pinder *et al*²⁸ – 25.0%, Kissane *et al*²⁹ - 8.6%, and Pascoe *et al*³⁰ - 11.5%. This discrepancy can be explained by the fact that both Pinder *et al*²⁸ and Pascoe *et al*³⁰ had used a cutoff of 11 or above in the HADS whereas the present study has used the cutoff of above seven. The present study also identified 6 (12.0%) individuals with anxiety had the cutoff been taken as 11 or above. This would have been in agreement with results quoted by aforementioned studies. Furthermore, study by Kissane *et al*²⁹ used DSM IV diagnostic criteria to come to a diagnosis of an anxiety disorder and obviously the element of interviewer bias cannot be ruled out. The lack of knowledge about the disease and its treatment may be considered as one of the causes of higher anxiety in our cancer patients.

SUMMARY AND CONCLUSION

The diagnosis of cancer carries with it a significant amount of psychological morbidity, both subjectively experienced and objectively observed. Cancer treatments (chemotherapy and radiotherapy) further aggravate matters by becoming additional stressors. The present study was carried out to assess and compare psychiatric morbidities in cancer patients and healthy individuals. All patients were assessed by means of clinical interview and psychological tests.

Results of the study showed (1) A total of 30 (60.0%) were detected as ‘cases’ or having psychiatric morbidity based on a cutoff score of above 2 on 12 item GHQ, (2) Cancer patients had statistically significant higher GHQ scores (mean 3.7) as compared to controls (mean 0.9800), (3) Both anxiety (40.0%) and depression (28.0%) were significantly higher in cancer patients than the controls and the two tended to go together and (4) A significant ($p < 0.05$) proportion, i.e. 26.0% cancer patients could be given a diagnostic category using ICD 10 DCR.

The impact of cancer produces a great deal of psychiatric morbidity. Psychiatrists can play very important role in an integrated oncology treatment team by providing specialized treatment which will not only reduce psychiatric morbidity but also result in improvement in overall quality of life of cancer patients.

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Changing routes of hysterectomy : a cross sectional and comparative study

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ABSTRACT

Hysterectomy is one of the most frequently performed major surgical procedure in women. Traditionally, the uterus has been removed either by abdominal or vaginal route. In spite of the recommendations in favor of vaginal hysterectomy majority of the hysterectomies are still done by the means of abdominal route and vaginal route is utilized mostly for prolapsed uterus. This study was done to see the current trend of routes of hysterectomy for benign condition at Kathmandu Medical College Teaching Hospital and its indication. This was a cross-sectional and comparative study done for 24 months (Jan 2008- Dec 2009). Data for the year 2009 was collected prospectively and for the year 2008 case notes of all the cases of hysterectomy was reviewed. Total 317 cases of hysterectomy were done for benign condition in KMCTH during the 2 year study period. Of the 317 cases 124 was done during the year 2008 and 193 during 2009. Three major route namely vaginal hysterectomy (VH), Abdominal Hysterectomy (AH), and Laparoscopic hysterectomy (LH) was utilized for performing hysterectomy. Major indication for hysterectomy was pelvic organ prolapse (POP) followed by abnormal uterine bleeding (AUB), and fibroid uterus during both the years. Route of hysterectomy in the cases with non prolapsed pelvic organ were AH (94.0%) and LH (6.0%) during the year 2008 and VH (6.0%), AH (76%) and LH (18.0%) during the year 2009. Major indications for hysterectomy are POP, AUB, and fibroid uterus. VH is mainly done for the cases of POP. AH is still the major route for indications other than POP. Minimally invasive approach like VH for non descent uterus and LH although is rising needs to be practiced more.

Keywords: Routes of hysterectomy, laparoscopic hysterectomy, abdominal hysterectomy, vaginal hysterectomy.

INTRODUCTION

Hysterectomy is, after Caesarean delivery, one of the most frequently performed major surgical procedure in women.¹ Traditionally, the uterus has been removed either by abdominal or vaginal route. Laparoscopic assisted vaginal hysterectomy gained its popularity in 1990s and gynecologist in developed country started opting for laparoscopic hysterectomy (LH) in the place of abdominal hysterectomy (AH).² New approaches like total laparoscopic hysterectomy and robotic-assisted vaginal hysterectomy have also emerged in recent days.^{3,4} In a recent meta-analysis to evaluate the most appropriate approach to hysterectomy 27 trials were reviewed.⁵ This meta-analysis on the basis of significant speedier return to normal activities and improvements in terms of other secondary outcomes (shorter duration of hospital stay and fewer unspecified infections or febrile episodes) suggest that vaginal hysterectomy (VH) is preferable to AH, provided it can be performed safely. Where VH is not possible, LH may help to avoid AH, but the former confers a greater chance of bladder or ureteral injury.⁵

A recent Cochrane review of surgical approach for benign gynaecological disease, involving 4495 women

in 34 trials, concluded that the vaginal approach is preferred to the abdominal approach. When vaginal hysterectomy is not possible, laparoscopic hysterectomy may avoid the need for an approach by laparotomy.⁶

ACOG recommendation regarding routes of hysterectomy for benign indications is also similar.⁷

In spite of the recommendations in favor of vaginal hysterectomy majority of the hysterectomies are still done by the means of abdominal route and vaginal route is utilized mostly for prolapsed uterus. Currently in the United States, about 64% of hysterectomies for benign disease are performed abdominally, about 22.0% are performed vaginally, and about 14.0% are performed laparoscopically.⁸ In Sweden nearly 70.0% of the hysterectomy for benign indications are done by abdominal route.⁹

This study was done to see the current trend of route of hysterectomy for benign condition at KMCTH and its indication, to compare the routes of hysterectomy for benign conditions between the year 2008 and 2009, and to find out the proportion of hysterectomy done in a minimally invasive approach.

Table-1: Indications of hysterectomy

Indications	Year 2008 n=124	Year 2009 n=193
POP	59 (47.6%)	68 (35.0%)
AUB	28 (22.6%)	49 (26.0%)
Fibroid	28 (22.6%)	44 (24.0%)
Ovarian cyst	6 (4.8%)	22 (11.0%)
Cx dysplasia	3 (2.4%)	6 (2.2%)
Others	X	4 (1.8%)

MATERIALS AND METHODS

This was a Cross sectional and comparative study done in the department of Obstetrics and gynaecology, KMCTH for the period of 24 months from January 2008 to December 2009. Data for year 2009 was collected prospectively and for the year 2008 charts of the cases of hysterectomy were reviewed. Cases of hysterectomy done for malignancy and emergency obstetric hysterectomy were excluded from the study as these indications mandate abdominal route. For each cases of hysterectomy done for benign condition data were collected on characteristics like age, indication of hysterectomy, and route of hysterectomy. Data were entered into a computer database using Microsoft Excel spreadsheet and statistical analysis was performed. Results are presented as frequencies, percentages and descriptive statistics.

RESULTS

Total hysterectomy for benign indication during the 24 months study period was 317.

Out of this 124 was done in the year 2008 and 193 in the year 2009. Three major route namely vaginal hysterectomy (VH), Abdominal Hysterectomy (AH), and Laparoscopic hysterectomy (LH) was utilized for performing hysterectomy. Mean age for AH was 46.33 years, for VH- 57.22 years, and LH- 46.41 years. Major indication of hysterectomy was pelvic organ prolapse (POP), abnormal uterine bleeding (AUB), and fibroid uterus (Table-1).

Route of hysterectomy in majority of the cases were AH followed closely by VH during both the years. All of the VH during the year 2008 were for POP, and most of the

VH during the year 2009 also was for POP. Total number of cases operated by LH increased in 2009 (Table-2).

Routes of hysterectomy for indication other than prolapse in year 2008 were mainly AH (94.0%) and LH was done only in 4 cases (6.0%). In the year 2009 non descent VH was also done in addition to the AH and LH.

Route of hysterectomy in the 125 cases with conditions other than prolapse in year 2009 were VH in 8, AH in 94, and LH in 23 (Table-3).

Minimally invasive surgery (MIS) like non descent VH and LH was done only in 6.0% of the cases during the year 2008 (Fig. 1). The proportion of MIS increased to 25.0% during the year 2009 (Fig. 2).

DISCUSSION

This study shows that majority of the hysterectomy was done for the pelvic organ prolapse, followed by abnormal uterine bleeding, and fibroid uterus. The indication for hysterectomy in developed countries like USA and European countries are mainly fibroid uterus, dysfunctional uterine bleeding, endometriosis and pelvic pain and only a small percentage of hysterectomies are performed for pelvic organ prolapse.^{10,11} The difference in the indication can be explained by the fact that Nepal has a very high prevalence POP.¹² Second commonest indication for hysterectomy in this study was abnormal uterine bleeding as alternative modalities of treatment for menorrhagia like endometrial ablation, and Uterine artery embolization are not practiced in Nepal.

During the study period routes of hysterectomy was mainly AH (49.0%), VH (42.0%), and LH (9.0%). Majority of the VH was done for POP.

In the indication other than POP 82.0% of the hysterectomy was AH, 14.0% was LH and only 4.0% was VH. This trend in route of hysterectomy for benign indications are similar to the trend in developed country like USA where 64.0% of the hysterectomy are AH, 22.0% VH, and 14.0% LH.⁸ In Sweden 80.0% of the hysterectomy done for benign indication are AH.

In the year 2008 VH was done only for prolapsed uterus, and majority of the non prolapsed uterus was operated via abdominal route. This trend reflects the mindset of

Table-2: Routes of hysterectomy

Routes	Year 2008	Year 2009	Total
VH	57 (46.0%)	76 (40.0%)	133 (42.0%)
AH	63 (50.8%)	94 (48.0%)	157 (49.0%)
LH	4 (3.2%)	23(12.0%)	27 (9.0%)
Total	124 (100%)	193 (100%)	317 (100%)

Table-3: Routes of hysterectomy-non descent uterus

Routes	Year 2008	Year 2009	Total
VH	x	8 (6.0%)	8 (4.0%)
AH	63 (94.0%)	94 (76.0%)	157 (82.0%)
LH	4 (6.0%)	23 (18.0%)	27 (14.0%)
Total	67 (100%)	125 (100%)	192 (100%)

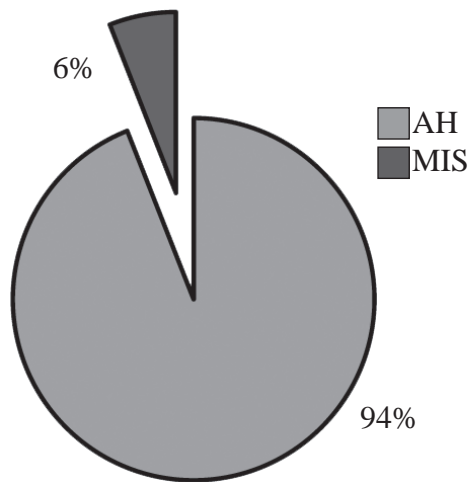


Fig. 1. Minimally Invasive Surgery-2008

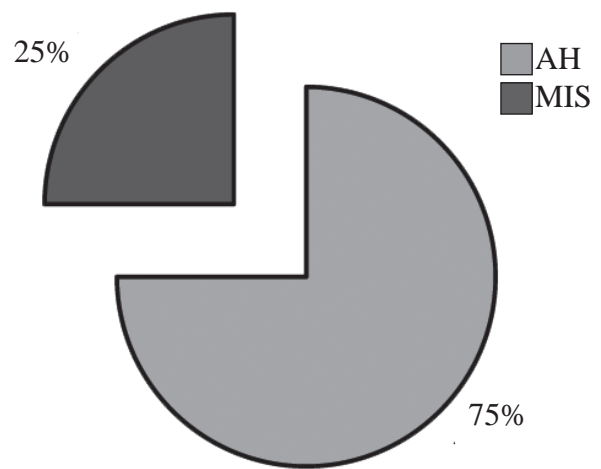


Fig. 2. Minimally Invasive Surgery-2009

the gynecologist who are trained to do VH only for POP. However, in the year 2009, VH was introduced also for the non prolapsed uterus. The reason behind this change in attitude is increasing experience with LH which gave surgeons the skill and confidence to do VH even for non prolapsed uterus. In recent times large volume of data are available on the feasibility of removing a nonprolapsed uterus vaginally.¹³⁻¹⁵

All the traditional contraindication like vaginal narrowing, inaccessibility of the uterus,

Lack of uterine descent, larger uterine volume, nulliparity, and previous cesarean delivery are no longer considered as contraindication for vaginal hysterectomy. In our experience even during our initial phase of nondescent vaginal hysterectomy we have managed to do successful vaginal hysterectomy for large fibroid uterus with uterine size upto 20 weeks size, nulliparous uteri, and with history of previous cesarean delivery.

Most of the current recommendation favor minimally invasive surgery like VH over AH.⁵⁻⁷ In the developing country like Nepal feasibility and acceptability of non descent VH should be high as this procedure does not require expensive instruments and learning curve of this procedure is very short.¹³ It will also prove economical for the low resource country like Nepal. To increase the percentage of hysterectomy done by minimally invasive route like VH, making vaginal route as norm when planning hysterectomy for benign indication can be useful. This approach has been proven effective in a study done by Varma *et al* where rate of vaginal hysterectomy increased from 32.0-95.0% in just five years time.¹³

Major indication for hysterectomy was POP, AUB, and Fibroid uterus. AH was the major route of hysterectomy for indication other than prolapse. VH was typically utilized for pelvic organ prolapse. Trend is rising towards minimally invasive approach like non descent VH and LH.

VH is the least invasive approach to hysterectomy, and its use should be encouraged as the preferred MIS (minimally invasive surgery) option for women requiring hysterectomy for benign conditions.

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An evaluation of pulmonary parameters in two groups of subjects during Yoga practice

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ABSTRACT

The purpose of the present study was to investigate how far the short term practice of yoga (30 and 60 days) for an hour daily can improve the respiratory function. Male subjects (n=50, age 30-50 years) were randomly selected. Respiratory parameters (FVC, FEV₁, PEFR, FEF_{25-75%} and MVV) were determined by using a multifunctional computerized spirometer. Yoga (posture and *pranayamas*) practice for a month produced no significant improvement in pulmonary parameters. Nevertheless, when the subjects continued it for next 30 days, i.e., after 60 days significant changes were noted in FVC (p<0.001), FEV₁ (p<0.01) and PEFR (p<0.05). The result also revealed that amongst them 30 days yoga training resulted in a significant increase in FVC in elder group of people (age 41-50 yrs) where as in younger group (age 30-40 yrs) the changes were not so prominent. Result indicated that short term (30 days) yoga practice quickly improves respiratory functions in relatively elder people (age 41-50 yrs), when many of them in our tropical country suffer from primary level of respiratory problem. Regular practice of Yoga (posture and *pranayamas*) can prevent it by increasing the efficacy of respiratory muscles.

Keywords: Yoga, *pranayama*, breathing exercises, FVC, FEV₁, PEFR.

INTRODUCTION

Yoga is popular all over the world nowadays. It increases longevity,¹ and has therapeutic and rehabilitative effects.²⁻⁵ Yoga techniques include the practice of meditation, a variety of breathing exercises, and the practice of a number of physical exercises and postures, in which the focus is more on isometric exercise and stretching than on aerobic fitness.⁶

Pranayama is an important component of yoga training. *Pranayama* (controlled breathing exercise) improves the air way reactivity in the asthmatic individuals.⁷ It was noted that high frequency breathing exercise resulted in more than 10 fold increase in expired minute ventilation.⁸ Many reports supported the beneficial effect of long-term yoga training on pulmonary functions.⁹⁻¹¹

It has been reported that yoga practice an hour/day, for 12 weeks resulted significant increment in the forced vital capacity (FVC), forced expiratory volume in 1st second (FEV₁) and peak expiratory flow rate (PEFR).¹² Yoga was proved to be helpful for bronchial asthma.¹³ In a study with subjects between the ages of 40 to 60 years with no previous yoga experience, 80.0% showed improvement in breath holding time after the completion of an intensive yoga program.¹⁴

The purpose of the present investigation was to determine how far yoga practice over a short duration of 60 days for an hour daily can improve respiratory function.

SUBJECTS AND METHODS

The present study was conducted in Department of Physiology of Rohilkhand Medical College and Hospital with the collaboration of Yoga center of Bareilly, U.P., India.

New comer male subjects (age 30-50 years) were selected randomly from the yoga center of Bareilly, practicing yoga regularly. The subjects were priorly informed about the study and the consents were taken. They were divided in to two age groups: Gr. - A (30-40 yrs, n=25) and Gr.- B (41-50 yrs, n=25).

The pulmonary function tests or respiratory capacity of the subjects were determined using a multifunctional computerized spirometer (Sl. No. A-23-050.0883). Forced Vital Capacity (FVC), Forced Expired Volume-1st sec. (FEV₁), Peak Expiratory Flow Rate (PEFR), Forced Expiratory Flow (FEF_{25-75%}) and Maximum Voluntary Ventilation (MVV) were measured.

The subjects were asked to take a deep breath and blow it into the mouth piece of the spirometer. A nasal clip was

Study of Pathak *et al.* indicated subjects performing 'Pranayama' though a little older in age than matched control group, preserved their body in better frame, remained more proportionate with respiratory functions and exhibited stronger grip strength.¹⁹

Present study indicated that short term (30 days) Yoga practice (posture and *pranayamas*) is beneficial mainly in elder group of people (age 41-50 yrs) when many people in our tropical country suffer from primary level of respiratory problems. Regular practice of Yoga can prevent it by increasing the efficacy of respiratory muscles.

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Age at menarche of subpopulation of Nepalese girls

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ABSTRACT

The present study was carried out to explore the mean age at menarche of school going girls of Western Nepal, Pokhara and to determine the factors influencing age at menarche. The data was collected from five schools located within the Pokhara Valley of Western Nepal. Only the students who had experienced menarche were included in the study. Verbal consent was obtained after explaining the objectives of the study; the students were interviewed for personal and family details and information obtained was recorded. The age at menarche was found to be 12.69 ±0.95 years. The mean age at menarche of those attending community schools was significantly higher than that of those attending private schools (12.85 ±0.87 vs 12.41 ±0.99 years). The mean age at menarche was found to be delayed with increase in number of family members and more siblings. The mean age at menarche of the vegetarians was higher than that of non-vegetarians (12.82. ± 0.81 vs 12.68 ±0.95 years).

Keywords: Age at menarche, adolescent, western Nepal.

INTRODUCTION

Menarche indicates the specific stage of first periodical regular flow of blood from uterus in all healthy females.¹ It is the most striking event in the process of female puberty, which in turn is a part of adolescence. Sequence of events takes place throughout puberty - thelarche, the development of breasts, followed by pubarche, the development of axillary and pubic hair, and then by menarche, the first menstrual period.²

Menarcheal age serves as an easily identifiable marker for developmental status relative to same-age peers. Several reports are found stating that the females having early menarche have elevated risk for breast cancer.^{3,4} The age at menarche is not fixed, but varies from population to population.⁵ It may also vary with races, size of the family and environmental factors.^{3,5-9} Few reports have shown that age at menarche varies with passage of time, occurring earlier than it did.⁹ However, literature about the age of menarche in Nepalese population is scanty and hence, it is worth studying. Present study attempted to explore the age at menarche and factors influencing it amongst the girls of Western Nepal, Pokhara.

SUBJECTS AND METHODS

The study sites were five schools located in the Pokhara Valley, Western Nepal. It was a cross-sectional study following non-probability sampling method. Data collection was done for duration of four months (March

2006 to June 2006). The female students (n=450) of the selected schools who had already experienced menarche as well as those who were facing secondary amenorrhea at the time of study were included. The girls were personally interviewed for the required information (monthly income, earner's occupation, menarche age of mother and eldest sister etc).

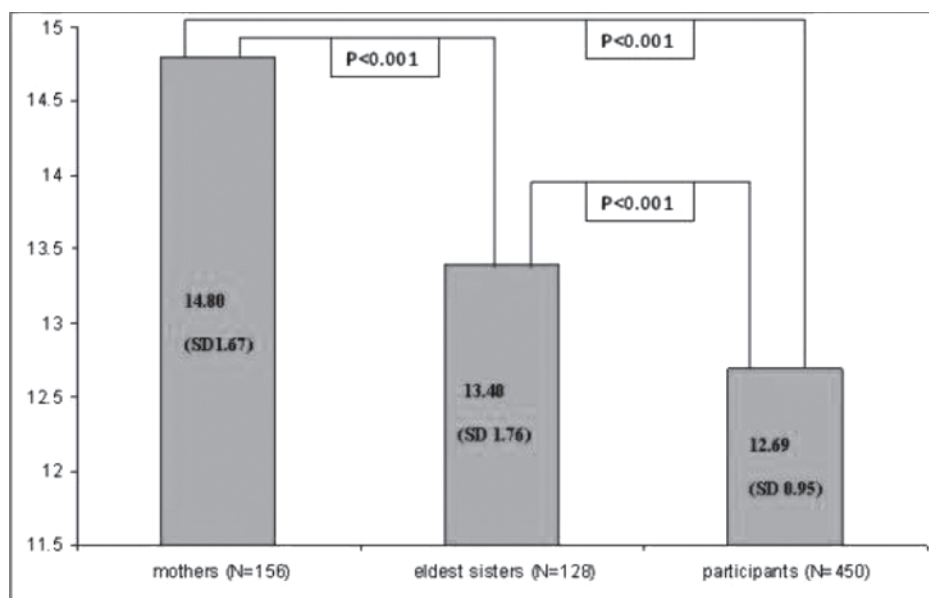
The data thus collected was analyzed using statistical package for the social sciences (SPSS Version 10.0) and MS-Excel. Independent-samples t-test was used to determine the significance level of the difference in mean age at menarche. Non-parametric two-independent-samples test (Mann-Whitney U) was applied to determine the significance level of the differences in age at menarche on the basis of type of school attended.

RESULTS

The age range of the participants was found to be 9-20 years and the mean age at menarche was found to be 12.69 ±0.95 years. The earliest occurrence of menarche was found in a girl at the age of 9 years.

Fig. 1. shows the mean age at menarche of the participants (12.69 years), their mothers (14.80 years) and their eldest sisters (13.40 years). The difference between mean age at menarche among them was found statistically significant (p<0.001).

Table-1 shows the mean age at menarche according to dietary habit. It was seen that the mean age at menarche



attending. The mean age at menarche of the participants attending private school was significantly higher (12.41 ± 0.99 years) than that of the participants attending community school (12.85 ± 0.87 years).

DISCUSSION

In the present study, the mean age at menarche of young girls from Western Nepal, Pokhara was found to be 12.69 ± 0.95 years. A study by Sharma *et al* showed median age at menarche of schoolgirls of

Fig. 1. Mean age at menarche of the participants, their mothers and their eldest sisters Dharan to be 12 years with age range 11-17 years which was

Table-1: Mean age at menarche according to dietary habit

Parameter		N=450(%)	Mean age at menarche(SD)	p value
Dietary habit	Vegetarian	17 (3.77)	12.82 (0.81)	0.544
	non-vegetarian	433 (96.22)	12.68 (0.95)	

of the vegetarian participants (n=17) was little higher than that of non-vegetarians (n=433) [12.82 ± 0.81 vs 12.68 ± 0.95 years].

Table-2 gives the comparison of the family size and number of siblings of the participants with their age at menarche. It was seen that participants from a family of four or fewer members had a lesser age at menarche (at 12.46 ± 0.93 years) while that for participants from families with more than four members was found to be $12.76 (\pm 0.94)$ years. This result was significant statistically at $p < 0.005$. Also, an increase in age at menarche was seen with more number of siblings. The mean age at menarche of the participants with only one or no siblings was significantly lower than that of those with more than one siblings (12.36 ± 0.86 vs 12.79 ± 0.94 years).

Table-3 shows the difference between ages at menarche of the participants according to type of school they were

Table-2: Mean age at menarche in relation to family size and number of siblings

Parameter		N=450 (%)	Mean age at menarche(SD)	p value
Number of family members	4	108 (24.00)	12.46 (0.93)	<0.005
	≤ 4	342 (76.00)	12.76 (0.94)	
Number of siblings	1	108 (24.00)	12.36 (0.86)	<0.001
	≤ 1	342 (76.00)	12.79 (0.94)	

slightly less than that of present study.¹⁰ In another study the mean age at menarche of 239 girls from Palpa and Rupandehi Districts was found to be 14.3 years.¹¹ This difference in mean age at menarche may be due to increased urbanization of Dhara and Pokhara relative to Palpa and Rupandehi. Increased urbanization can lead to better socio-economic status, more sedentary lifestyle, exposure to media and changes in dietary habits as well as better psychological preparation all of which can have an effect in the age at menarche.^{5,8,9}

The mean age at menarche of the students in the present study was found to be lesser than that of their elder sisters (13.4 ± 1.76 years) which was in turn lesser than that of their mothers, (14.8 ± 1.67 years). This shows a descending pattern of age at menarche with successive generations. In a study carried out in Spain, mean age at menarche in mothers, (13.45 ± 1.51 years) was significantly ($p < 0.01$) greater than in daughters (13.03 ± 1.28 years).¹² Similarly, the study by Ersoy *et al* showed the mean menarcheal age of the mothers (13.6 ± 1.39 years) was higher than the mean menarcheal age of the daughters 12.82 ± 1.07 years, ($P < 0.001$).¹³ Studies have explained such decrease in age at menarche with successive generations as a result of increase in urbanization and environmental changes like better dwelling conditions, smaller family size compared to previous generations, food habits and sedentary life styles of successive generation.^{3-5,8,9} Children today are exposed to television advertisements for high-fat and simple-carbohydrate food and drinks. Also, activities like watching television with snacks can be associated with sedentary lifestyle.¹⁴ This in turn is associated with

Table-3: Relation of mean age at menarche and school type

Type of school	N=450 (%)	Mean age at (SD) menarche	p value
Private	166 (36.88)	12.41 (± 0.99)	<0.001
Community	284 (63.11)	12.85 (± 0.87)	

increasing body mass and body fat. The fat cells secrete leptin. Leptin can influence the synthesis and/or secretion of other hypothalamic peptides which in turn modulate gonadotropin-releasing hormone (GnRH) release.^{15,16} Rise in GnRH leads to increased production of gonadotropins (luteinizing hormone; LH and follicular stimulating hormone; FSH). Higher levels of FSH and LH causes resultant increase in estrogen level. Rising levels of estrogens and pulsatile GnRH secretion leads to initiation of menses and eventually create cyclic menstrual patterns causing early menstruation.¹⁷

In the present study, mean age at menarche of the vegetarian participants 12.82 (± 0.81) years, was higher than that of non-vegetarians which was 12.68 (± 0.95) years. This result, however, was found to be statistically insignificant ($p=0.544$). Similarly, many studies have reported the accelerating influence of good nutrition on puberty from many parts of the world. These studies had a common belief that the protein rich high calorie diet causes better physical maturation and early menarche.^{5,18,19} On the contrary a study carried out by Padmavati *et al* reported the delayed onset of menarche of non-vegetarian girls.¹⁸ Also, in our study; comparison was limited by small sample size of vegetarians compared to non-vegetarians.

The mean age at menarche in the current study was found to be delayed with increase in number of family members ($p<0.005$) and siblings ($p<0.001$) and both results were statistically significant. A study by Padez *et al* has also shown girls born in small families with one child matured earlier than those born in large families with four or more children.⁷ Another study by Roberts *et al* found that menarcheal age is strongly influenced by family size and also partly by position in family i.e., menarche occurs later in large sibships.^{20,21} However, Salces *et al* found no such significant contribution of birth order on the age at menarche.^{12,22}

The mean age at menarche of girls from private schools was lower than that of the girls from community school. Attending private school indicates better family income, which is also a component of socioeconomic status. However, the age at menarche of the participants in our study could not be correlated with monthly family income as all the participants were not able to give information regarding the monthly income of the family.

There are other components associated with socioeconomic status (family size, living conditions, nutrition supplement) which are usually associated positively with early menarche.^{5,18,19} A study carried out in Nigeria showed that school girls from higher socioeconomic class reached menarche earlier than the lower socio-economic counterparts.²³ In a similar cross-section study carried out on menarcheal age in 2087 Ghanaian school girls, the menarcheal age (13.98 ± 1.42 years) was found to be significantly influenced by social class, parents ethnic origin, educational institution and home living area.²⁴ Nepalese evidence is consistent with the argument that menarcheal timing is associated with nutritional status where early maturing females come from richer family who enjoy a greater availability of good food than others.¹¹ Another explanation according a report made by Danker Hopfe is that the degree of urbanization, occupation and educational status of parents, family income, dwelling conditions, as well as family size do not exert a direct influence on the occurrence of the first menstruation. These are essentially 'secondary' factors, which are more or less associated with those factors that presumably have a more direct influence, such as nutritional condition and health status.⁹

Menarche is the most striking event in the process of female puberty. Menarcheal age serves as a marker for developmental status relative to same-age peers. Several reports have also associated early menarche with increased risk for morbid conditions like breast cancer. The mean age at menarche in our study was found to be 12.69 ± 0.95 years. Higher age at menarche was associated with attending community school, larger family size and larger number of siblings. However, this data does not represent the whole Nepalese population. Larger studies regarding age at menarche need to be carried out in larger representative population.

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Common behaviour problems amongst primary school children in slum dwelling area of Kathmandu Valley

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ABSTRACT

A cross sectional observation study was carried out in primary school children of slum dwelling area of Kathmandu Valley which included 454 students. The aim of study was to find out morbidity in habit disorders in age group of 6-10 years so that early detection will be helpful to correct them to prevent it from further personality maladjustment. There was no statistical difference in gender wise habit disorders. The morbidity is due to multiple factors of physico- social environment. However severity of disease is not more here in this area.

Keywords: Habits, disorder and primary school children.

INTRODUCTION

The study was carried on behaviour disorder morbidity pattern amongst primary school children in slum dwelling area schools of Kathmandu valley which includes 454 students of age between 6-10 years. The objective were to collect health related information as behavior in children at primary school age and to study common behavioural problems which can be dealt at school level in relation to psychological aspect like behaviour, dental hygiene, eating habits and physical activity. Significant associations have been obtained consistently between learning disabilities and behaviour problems and various studies have supported in other country.¹

Extensive review of issues pertaining to the relationship between externalizing behaviour problems and academic underachievement, stated that, in childhood, inattention and hyperactivity were stronger correlates of academic problems than aggression.²

As children in primary school are vulnerable to any infection, similarly they adopt behavior disorders in this age group. However it remains a cause of concern for their parents till they are grown up. Many times parents do not bother for such habits and later on they repent. Language and speech disorder are in school age population and more prevalent in toddlers and pre-school but it is not observed in our study. Similarly sleep disorder is also not observed in any child.

Although the school age children morbidity is low in habit disorder and behavior problems, which keep them away from friends due to guilt feeling. In Nepal poor economic condition, inadequate infra structure of medical services inaccessibility to health services

declines the study environment in the school specially for these children.

MATERIALS AND METHODS

This study was conducted in NMC Hospital through department of community medicine while simultaneously carrying out school health survey in slum dwelling area of Kathmandu Valley. A predesigned semi-structured performa of questionnaire was prepared and pretested in one school to know the magnitude of problems in relation to behavior disorder and personal hygiene.

Data was analyzed on SPSS and excel soft ware. Poverty is a major underlying cause together with ignorance and a fatalistic attitude in familial environment. The teachers also play the important part in observing the students and coordinating with parents' level to time.

RESULTS

Common behaviour problems among primary school children 6-10 years of age were conducted in slum dwelling area of Kathmandu Valley. Total sample size of the study was 454. Among them 251 (55.3%) were male and 203 (44.7%) were female. Out of the 454 children 55 (12.1%) were felling nail biting, 35 (7.7%) thumb shucking, 27 (6.0%) bed wetting, 7 (1.5%) food fad, 16 (3.2%) temper tantrum and 314 (69.2%) were none of problems (Table-1). Among them the bathing habits of the studied students were 266 (58.6%) once a week, 74 (16.3%) twice a week, 21 (4.6%) thrice a week and 93 (20.5%) regular bathing were found (Table-2). The brushing habits were found 333 (73.4%) once a day, 112 (24.7%) twice a day and 9 (2.0%) regular (Table-3).

Table-1: Behaviour of school children parenthesis is the percentages

Behaviour	n.		
	Male	Female	Total
Nail biting	20 (4.4)	35 (7.7)	55 (12.1)
Thumb shucking	9 (2.0)	26 (5.7)	35 (7.7)
Bed wetting	6 (1.3)	21 (4.6)	27 (5.9)
Food fad	4 (0.9)	3 (0.7)	7 (1.5)
Temper tantrum	12 (2.6)	4 (0.88)	16 (3.5)
None	200 (44.1)	114 (25.1)	314 (69.2)
Total	251 (55.3)	203 (44.7)	454 (100)

Figures in parenthesis are in percentages

DISCUSSION

Our study subjects include 454 students in slum area of Kathmandu Valley. The minimum care by parents after the school hours prompted us to take up this study in this developing country. In this study children aged less than 10 years were commonly affected. One hundred forty (40.8%) males were affected as observed here. This study revealed nail biting is a common behavior problem in the children of age group 6-10 years. Total 55 (12.1%) children found to have nail biting in male 20 (4.4%) and female 35 (7.7%) respectively as depicted in Table-1. Infected nail can lead to the skin diseases. This kind of habits can make parents, teachers or care taker as a cause of concern. When they became more conscious of their appearance thumb shucking habit was found 35 (7.7%) next common disorder in this study. When they are anxious or lonely, they also immediately start thumb shucking. Food fad amongst school children is common in 7 (1.5%) subjects only. How ever temper tantrum is also observed in 16 (3.5%) students. None of behavior disorders observed in 314 (69.2%) students which is remarkable in slum dwelling area. These are few common adjustment disorders that are routinely diagnosed during school health survey as it is in our study. These disorders are mainly treated by educating children and parents. Ritter 1989 also estimated social competence with learning disability including child behavior response.³

Table-2: Bathing habits amongst subjects (N= 454)

Bathing habits	Male	Female	Total
Once a week	157 (34.6)	109 (26.2)	266 (58.6)
Twice a week	33 (7.7)	41 (9)	74 (16.3)
Thrice a week	8 (3.1)	13 (2.9)	21 (4.6)
Regular	48 (10.6)	45 (9.9)	93 (20.5)
Total	246 (54.2)	208 (45.8)	454 (100)

Figures in parenthesis are in percentages

Social scientist can create a breach in such asocial habits by detecting at early age and it can be corrected with help of clinical psychologist or psychiatrist in dealing with behavior therapy. The childhood set up conduct disorder refers to a persistent pattern of anti-social behavior in which individual repeatedly breaks social rules and carried out such acts that upset other people. The ratio of males to females with childhood disorder is lower among Indian children.⁴

The range of disorders may be caused by a number of factors such as parenting style which is inconsistent or contradictory, family or marital problems, child abuse or neglect, overindulgence, injury or chronic illness, separation or bereavement.⁵

Anxiety and fearfulness are part of normal development however, when they persist and become generalised they can develop into socially disabling conditions and required intervention. Approximately 6.7% of children may develop anxiety disorders and of this 1/3rd may be over anxious while 1/3rd may have some phobia. Generalized anxiety disorder childhood one set social phobia, separation anxiety predictably cause by certain situation. School phobia occurs in 1-2% of children of an estimated 75.0% may be suffering some degree of depression and anxiety.⁶ The prevalence of childhood disorder is 11.1% in Indian children while Sakar *et al*⁷ reported the prevalence rate of such behavior as 7.1%. Recently Sreenath *et al* had reported as low 0.2% by Deivasigamani.⁸

Bed wetting is a batting to parents but embarrassing for children. In this study bed wetting habits is found in 27 (5.9%) school children. This disorder in children is the cause of noxious smelling of the bed. It is estimated that up to 20.0% of six years olds and approximately 5.0% of fourteen years olds, wet their beds some time bedwetting also continues into adulthood.⁹

Some myth amongst parents and teacher is this kind of habits may communicate from parents to children. But it is actually due to stress, anxiety, jealousy, fear or phobia which to take place in school. Only 93(20.5%) subject takes daily bath regularly while others are taking

Table-3: Brushing habits in school children (N=454)

Brushing habits	n		
	Male	Female	Total
Once a day	187 (41.2)	146 (32.2)	333 (73.4)
Twice a daya	63 (13.9)	49 (10.8)	112 (24.7)
Regular	3 (0.7)	6 (1.3)	9 (2.0)
Total	253 (55.7)	201(44.3)	454 (100)

Figures in parenthesis are percentages

bath very irregularly like once a week in 266 (58.6%) twice a week in 74 (16.3%) cases and thrice a week in 21(4.6%) is frequently for bath (Table-2). Similarly brushing of teeth is also erratic amongst students. Only 9 (2.0%) brushes their teeth daily but in spite of this the teeth problems are not developed by this age group.

It needs regular further follow up (Table-3).

The simplest assessment is keen observation during school health survey for habit disorders.

Management is by treating underlying psychiatric condition, family therapy, parental training and liaison with school to investigate possible reasons for refusal and negotiate re-entry.

Teachers should be taken in to confidence for training and initial assessment and follow up regularly. They have to play a vital role to change their habit by the reward and/or punishment. The counseling was provided to them during the study period. This is due to anxiety that children develop. Health education and counseling by psychiatrist/psychiatric social worker is a need of hour.

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Assessment of kidney stone and prevalence of its chemical compositions

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ABSTRACT

Kidney stone analysis is the test done on the stone which cause problems when they block the flow of urine through or out of the kidneys. The stones cause severe pain and are also associated with morbidity and renal damage. There is also no clear understanding on the relative metabolic composition of renal calculi. Hence, the study is aimed to find out the chemical composition of it which can guide treatment and give information that may prevent more stones from forming. The study was carried out on the stones that had been sent to the department of Biochemistry (n = 99; M = 61; F = 38; Mean age: 33.6±14.4 years) Approximately 98.9% of stones were composed of oxalate, 95.9% of Calcium, 85.8% of phosphate, 62.6% of Urate, 46.4% of Ammonium and very few percentages of Carbonate.

Keywords: Kidney stones, renal calculi, diet, pH, urinary tract.

INTRODUCTION

Kidney Stones also called a or urolith (nephrorefers to the kidney, urorefers to urine, and -lith means stone and the condition is known as nephrolithiasis or urolithiasis) or renal calculi, are the extra chemicals that are not flushed out of the system through urine and get collected in the kidneys. These collected solid accumulations/chemicals form crystals and harden into stones. The basis of formation of these accumulations is the change in the normal balance of water, salts, minerals, and other substances found in urine. The main factor that change urine balance is water, the deficiency of which causes stick together of the salts, minerals, and other substances in the urine forming a stone.¹ Stones cause problems when they block the flow of urine through or out of the kidneys. When the stones move along the ureter, they cause severe pain and are also associated with morbidity and renal damage. This study may reveal useful information about the chemical nature of kidney stone in our general population and possible association of urinary tract infection which will be helpful in adopting preventive strategies to minimize stone formation and their recurrence.

Kidney stones have multifactorial causes, but some predisposing conditions are: Environmental factors, especially diet^{2,3} play an important role in expression of the tendency to stone formation.

Diet rich in oxalate or purines and high content of calcium in water can lead to excessive excretion of calcium, oxalate and uric acid in urine. Water deprivation causes stasis in the tubules and concentrates the solutes there. Absence of some dietary substances such as and

citric acid can lead to excessive amounts of oxalate and phosphate. Some drugs such as are poorly soluble and may precipitate forming stones or become part of the stone matrix. Also some metabolic and genetic disorders may contribute to stone formation. Beside these, pH is one of the most potent causes for stone formation as most solutes are only soluble within a finite pH range, for example, phosphates and carbonates are insoluble at an alkaline pH. Uric acid and calcium oxalate are insoluble at an acidic pH.⁴

Eighty percent of patients with nephrolithiasis form calcium stones, most of which are composed primarily of calcium oxalate or, less often, calcium phosphate.^{5,6} The other main types include uric acid, struvite (magnesium ammonium phosphate), and cystine stones. The same patient may have more than one type of stone concurrently (eg, calcium oxalate and uric acid).⁶

A person with a family history of kidney stones may be more likely to develop stones. Urinary tract infections, kidney disorders, certain metabolic disorders and people with renal tubular acidosis are also linked to develop kidney stones.

The first symptom of a kidney stone is extreme pain, which begins suddenly when a stone moves in the urinary tract and blocks the flow of urine causing a sharp, cramping pain in the back and side in the area of the kidney or in the lower abdomen and the pain may spread to the groin. Sometimes nausea and vomiting occur.⁷

MATERIALS AND METHODS

The study was carried out on 99 stone samples (61 males

Table-1: Prevalence of stones according to genders

Sex	Frequency	%
Males	61	61.6
Females	38	38.4
Total	99	100

and 38 females), that had been sent/received to the Department of Biochemistry, Nepal Medical College, Kathmandu, Nepal,

during the period of two years (2008- 2010). The age of subjects having stones were ranging from 5 to 72 years with the mean age of 33.

The stones were first examined for physical characteristics. Since the most stones are mixtures and may consists of several layers hence the stones were cut into two halves or were powdered for analysis of chemical compositions.⁸

Table-2: Prevalence of stones among different age groups

Age group	Males (%)	Females (%)	Total (%)
Up to 20	12 (80.0)	3 (20.0)	15 (15.1)
21-40	28 (53.8)	24 (46.1)	52 (52.5)
41-60	16 (64.0)	9 (36.0)	25 (25.2)
More than 61	1 (20.0)	4 (80.0)	5 (5.0)

RESULTS

A total of 99 kidney stones were analyzed in which male dominancy is seen among stone formers i.e. 61 are males (61.6%) and only 38 are females (38.4%) which is shown in Table-1. The highest number of cases, 52.5% of the total case is present in age group of 21-40 years followed by 25.2% in age group of 41-60 years. The least number of stone formers are present beyond their 60s, which is shown in Table-2. The composition of most of the stones analyzed were oxalate (98.9%) followed by uric acid (62.6%) as an organic constituents while as an inorganic constituents, stones were composed of calcium (95.9%), phosphate (85.8%), ammonium (46.4%) and very few number of stones were composed of carbonate (5.0%), which is shown in Table-3.

DISCUSSIONS

In present study, kidney stones were found to be more common in men than in women which is in accordance with the study by Stapleton FB⁹ this may be because of the larger muscle mass of men as compared to women. Thus, the daily breakdown of the tissue results in

increased metabolic waste and a predisposition of stone formation. The other more significant cause may be because of the male urinary tract being more complicated than the female urinary tract. The study showed the higher prevalence of stone formers ranging from 21- 40 years of their age which is supported by the study of Asplin *et al.*¹⁰ However, some study have stated the increased prevalence of stones when men enter into their 40s and continues to rise into their 70s. For women, the prevalence peaks in their 50s.⁷

The study could not find the living standard of stone formers though stone formation depends upon the standards of living and is strongly associated with race or ethnicity.¹¹ The chemicals most commonly present in kidney stones included oxalate as an organic constituent whereas calcium and phosphate were present as inorganic constituents. Other compounds such as uric acid, ammonium and carbonate were also present as a constituent of stones.

Kidney stones result when urine becomes too concentrated and substances in the urine crystallize to form stones. Besides dietary factor, the most common cause of kidney stones is not drinking enough water. Excessive consumption of meat protein leads to a marked increase in kidney stones because meat causes the over acidification of urine causing the increased excretion of oxalate, calcium and uric acid, whereas the excretion of citrate - which provides protection against stone formation is decreased. Overly acidic urine is the main risk factor for the formation of uric acid stones.

Dietary oxalate contributes to about half of the urinary oxalate. Spinach, rhubarb, beets, chocolate, nuts, tea, wheat bran, strawberries, and soya foods are known to increase urinary oxalate concentrations.¹² Vitamin C supplementation may increase urinary oxalate excretion and the risk of calcium oxalate crystallisation in patients who form calcium stones¹³ as oxalate is the oxidized product of vitamin C.

The main risk factors for calcium stones are a low volume of urine, increased excretion of oxalic acid and calcium and a deficiency of citrate, which inhibits crystallization in the urine. Also the sodium contained in common salt can increase the risk of stone formation, probably by increasing the urinary excretion of calcium.

Table-3: Chemical composition of stones and their valid percentage

Sex	Frequency	Organic constituents		Inorganic constituents			
		Oxalate	Uric acid	Calcium	Phosphate	Ammonium	Carbonate
Males	61	61	40	58	56	29	3
Females	38	37	22	37	29	17	2
Total (%)	99	98 (98.9)	62 (62.6)	95 (95.9)	85 (85.8)	46 (46.4)	5 (5.0)

Increased excretion of calcium results from impaired renal tubular reabsorption of calcium and increased bone resorption as a result of primary hyperparathyroidism.

The abundant form of phosphate in plants is phytate which forms insoluble complexes with calcium in the gastrointestinal tract and reduces calcium absorption and urinary calcium excretion, that consequently could reduce the risk of stone formation. However, this same action could result in increased oxalate absorption and urinary oxalate excretion, which would increase the risk of stone formation.¹⁴

Most kidney stones can pass through the urinary system with plenty of water—2 to 3 quarts a day—to help move the stone along, hence a simple and most important lifestyle change to prevent stones is to drink more liquids—water is the best. Someone who tends to form stones should try to drink enough liquids throughout the day. The basic pathophysiology of all stones is urinary super saturation with respect to the stone material, and treatment is based on decreasing or eliminating super saturation. Normal-Calcium, Low-Sodium, and Low-Animal-Protein Diets are recommended for Stone Prevention.

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Hemophilic psuedotumor- is there a role of radiotherapy? Literature review and a case report

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ABSTRACT

We share the literature and management of an adult with moderate hemophilia a presented with a calcaneal psuedotumor and non healing ulcer by radiation therapy, factor VIII and cryoprecipitate supplement. Numerous literatures so far have quoted the satisfactory role of radiotherapy in hemophilic psuedotumor. We found it to be of great help as our case responded with radiotherapy, factor VIII and cryoprecipitate supplement and has a satisfactory 2 years follow up.

Keywords: Hemophilia, hemophilic psuedotumor, radiotherapy, factor VIII.

INTRODUCTION

Psuedotumor of bone in patients with hemophilia is rare, but well known and serious complications. This condition is seen in 1.0-2.0% of patients with either hemophilia A or B.¹

A hemophilic psuedotumor (HP) is recognized as a collection of chronic encapsulated blood initiated in most case by a minor traumatic injury. This is followed by recurrent extra-articular hemorrhage either into muscle, periosteum, or intraosseous spaces and development of a tough surrounding fibrous capsule. Psuedotumor are categorized as osseous and soft tissue lesions, on the basis of anatomic location.² The radiographic findings of a soft tissue mass with areas of calcification and adjacent bone destruction in a patient with hemophilia is usually sufficient to make the diagnosis of a pseudotumor.³ Conventional radiography, sonography, CT, and MRI each play an important role in the diagnosis, characterization and management.⁴⁻⁶ The mass usually grows in size over months or years and presents as features of compression of adjacent structures and increasing destruction of bone resulting into severe pain and deformity.

Treatment of this condition is difficult and requires multimodal approach. The treatment modality in each patient depends on the size of psuedotumor, site of involvement and the presence of inhibitors. Varying degrees of success with surgical resection,^{7,8} radiation therapy,⁹⁻¹¹ combination of radiation with factor replacement^{12,13} or embolization¹⁴ have been reported in literature. Non surgical mode of treatment is being tried in form of radiotherapy alone or combined with factor VIII. We evaluated the results of previous studies and

proceed further and found good result (Table-1). We suggest radiotherapy can be tried in HP especially where surgical treatment is less helpful and disastrous.

MATERIALS AND METHODS

A 23 year male, diagnosed case of moderate hemophilia A at age 4 (factor VIII approximately 4.0%) sustained a trivial trauma and developed swelling around left ankle 4 months back prior to our consultation. He was a registered member of hemophilia society and was under treatment from the same society. He was managed with light compression bandage followed by factor supplement. The acute episode of pain subsided though the swelling persisted. One month later he observed the spontaneous increase in size of swelling and pain in the ankle. With in few days he observed the color change around ankle followed by skin necrosis and discharging sinus below the lateral malleolus and medial malleolus, which progressed and later resulted into a non healing sinus. He was then referred to our center.



Fig. 1. Preradiotherapy, non healing ulcer lateral malleolus

Table-1: Outcome of patients with hemophilic pseudotumors treated with radiotherapy–review of literature

Year	No of cases	Age(yrs)	Bones involved	Treatment	RT dose	Outcome	Author
1942	1	30	Femur	RT	NA	Resolved	Muller <i>et al</i> ²⁶
1942	1	13	Tibia	RT	16Gy	Resolved	Echternacht <i>et al</i> ²⁷
1948	1	51	Femur	RT	NA	Noimprovement	Ghormley <i>et al</i> ²⁸
1959	1	65	Pubis	RT	23.50 Gy	Stable for 2 years	Horwitz <i>et al</i> ²⁹
1965	2	11, 13	Calcaneum and cuboid	RT	15.76Gy and 16.72 Gy	Resolved	Chen <i>et al</i> ³⁰
1968	2	11, 15	Mandible and fifth metacarpal	RT	8Gy and 10Gy	Resolved	Lazarovitis <i>et al</i> ³¹
1972	3	18, 13, 57	B/L tibia. Femur	F-VIII, Cyoprecipitate +RT	16Gy, 18Gy, 20Gy	Resolved	Brant <i>et al</i> ³²
1975	1	2	Femur	F-VIII+RT	7.5Gy	Resolved	Hilagartnet <i>et al</i> ¹⁶
1984	1	12	Mandible	F-IX+RT	6Gy	Resolved	Correra <i>et al</i> ¹¹
1985	1	14	Orbit	Proplex+RT	7.5Gy	Resolved	Meyers <i>et al</i> ³³
1991	2	3, 13	Mandible and fifth metacarpal	F-IX+RT	6Gy, 16Gy	Resolved	Castaneda <i>et al</i> ²⁴
1996	1	13	Tibia	RT	6Gy	Resolved	Ozbek <i>et al</i> ¹⁰
1998	1	15	Calcaneum	F-VIII, Cyoprecipitate +RT	15Gy/10days	Resolved	Kashyap <i>et al</i> ¹³
1998	1	14	Ankle joint	F-VIII, Cyoprecipitate +RT	14GY/7Fr	Resolved	Lal <i>et al</i> ³⁴
2001	1	20	PNS	F-VIII, Cyoprecipitate +RT	500cGy/10days	Resolved	Gupta <i>et al</i> ³⁵
2004	1	NA	Thumb	F-VIII, Cyoprecipitate +RT	NA	Resolved	Issaivanan <i>et al</i> ¹²
2005	1	30	Knee joint	F-enriched	25Gy/10Fr Cyoprecipitate +RT	Resolved	Kapoor <i>et al</i> ²¹
2007	1	NA	Hand	RT	2000cGy/10Fr	Stable	Subhasi <i>et al</i> ²²
2008	1	6	Orbit	RT	900cGy/5Fr	Resolved	Nongrum <i>et al</i> ²³
2009	1	23	Calcaneum	F-VIII, Cyoprecipitate +RT	15Gy/7days	Resolved	Laxman <i>et al</i> (current study)

On examination, there was a non healing ulcer of 3x3 cm just below the medial and lateral malleolus (Fig.1). Peri-malleolar swelling and change of skin color to dusky red. Slough and necrotic tissue with sero-sanguinush discharge was seen in the bed of ulcer but there was no frank pus. Hematological and radiological evaluation was done immediately after admitting the patient. Hematology confirmed the diagnosis of moderate

hemophilia A and imaging with X ray (Fig. 2) and MRI (Fig. 3) suggested large lytic lesion with heterogeneous internal contents (? Hemorrhage) in the calcaneum with cutaneous sinus on the medial and posterolateral aspect. The findings were consistent with HP with edema of talus and fluid in the ankle and subtalar joint.

The patient was started on factor VIII at dose of 2500 units every 12 hourly, supplemented with



Fig. 2. Pre radiotherapy X-ray showing calcaneal psuedotumor.

cryoprecipitate, regular dressing of the wound and light compression bandage was combined with external radiotherapy for 7 days. A total of 15 Gy/7 days was given and discontinued after a symptomatic relief. Post

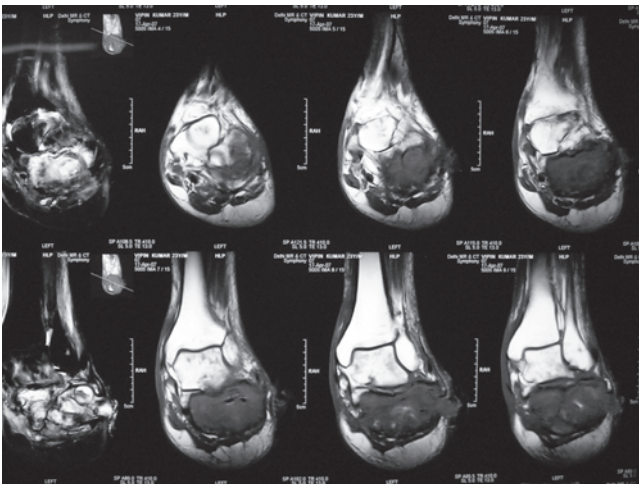


Fig. 3. Pre radiotherapy MRI section showing extent of lesion.

radiotherapy follow up after 2 months showed decrease in swelling and healed sinus on the medial aspect and organized but small persistent dry sinus on lateral side just below the lateral malleolus (Fig. 4). He was

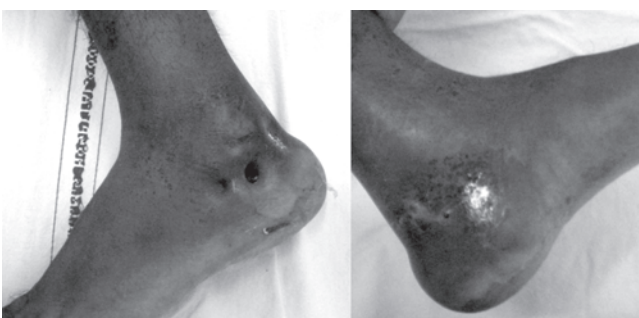


Fig. 4. Post radiotherapy healed sinus of medial and organized sinus of lateral malleolus

symptom free and was bearing weight over the affected limb comfortable. Two months post-radiotherapy X-ray (Fig. 5) and 6 months post-radio therapy MRI (Fig. 6) scans revealed reduction in the size of the lesion with some alteration in signal intensity due to evolution of the hemorrhagic products. A two years follow up is satisfactory, patient is ambulatory pain free and there is obliteration of sinus.

DISCUSSION

The diagnosis of HP is evident on the basis of clinical judgment, history of trauma, bleeding episodes, radio imaging and response of disease on treatment. Invasive methods to establish diagnosis like aspiration and biopsy are not favored for the fear of complication like; uncontrolled bleeding, skin necrosis, and non healing ulcers following procedures.

The mechanism of psuedotumor of bone is not understood well. Pathogenesis is unclear and several cases have been suggested : a) necrosis due to compression (bone destruction in the presence of hemarthrosis), b) subperiosteal or soft tissue hemorrhage with necrosis and bone destruction followed by bone formation and c) intraosseal hemorrhage , followed d by cyst alterations with bone destruction and subsequent hemorrhage.^{15,16}

The bony destruction in imaging is similar to sarcoma, tuberculosis, multiple myeloma, and metastatic conditions.¹⁷

The different classification is based upon localization of injuries. First of them distinguishes three types according to anatomical layout, secondary osseal alteration and radiological correspondence.¹⁸

Another classification distinguish between proximal HP and more frequent in adults and located in femur and pelvis and distal HP located in hands and feet, multiple more frequent in children and with better prognosis.¹

Magallon *et al*¹⁹ reviewed patient diagnosed with hemophilia A and B and other coagulopathies from 1965-1990. Of the 1831 patients, only 21 patients had psuedotumor, located mainly in the appendicular skeleton and the pelvis. Total number of patients with hemophilia A was 1108, of which only 16 patients (1.4%) had psuedotumor. Total number of patients with hemophilia B was 172, of which 4 (2.3%) had psuedotumor. The number of patients with other coagulopathies was 551, of which only 1 patient (0.2%) had psuedotumor. In the series, replacement therapy and surgery gave the good results, especially in cases that surgery was electively choosen.¹⁹

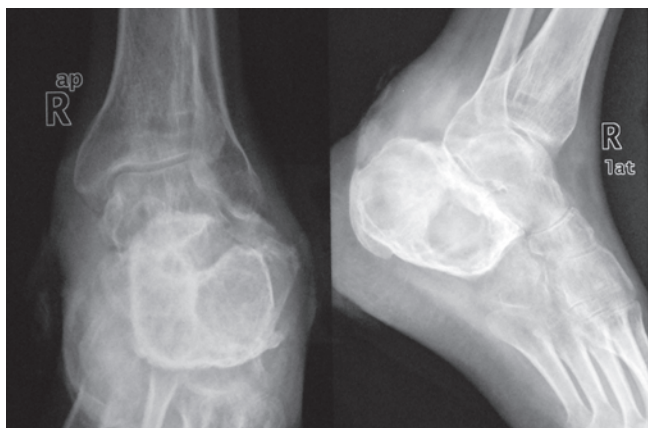


Fig. 5. Post radiotherapy X-ray showing healed lesion with sclerosis (2 months follow up).

Radiotherapy with or without factor VIII supplement has established better results in the previous studies. The mechanism of action of radiation is postulated to be the derangement of micro vascular architecture of the psuedotumor, resulting in increased fibroblastic activity leading to fibrosis.^{16,20} Secondary calcification occurs in four weeks and complete healing occurs in 8-12weeks. Literature provides evidence that low dose radiation for hemophilic psuedotumor is sufficient.

Medline database search of patients with HP receiving radiotherapy with or without factor VIII replacement yielded a case report and review article of 22 cases by Kapoor *et al.*²¹ Which included the study by Magallon *et al* also. In the subsequent years two more cases Subhasi *et al*²² and Nongrum *et al*²³ were reported who were treated by radiotherapy. The most common site of involvement was the femur 5/25 (20.0%), followed by tibia 4/25 (16.0%), mandible 3/25 (12.0%), calcaneum 3/25 (12.0%), orbit 2/25 (8.0%), hand 2/25 (8.0%), pubic bone 1/25 (4.0%) and ankle joint 1/25 (4.0%), Para nasal sinus involvement was seen in 1/25 (4.0%) . Fourteen of 22 (56.0%) patients only received radiotherapy while 11/25 (44.0%) received radiotherapy and replacement factors. In 23/25 (92.0%) patients, the lesion had either resolved or were in the process of resolving, 1 (4.0%) patient did not show any improvement, and 2/25 (8.0%) patients had stable diseases. Castaneda *et al*²⁴ have reviewed 17 psuedotumor treated with radiation either alone or in combination with factor replacement. The radiation dose varied between 750 cGy to 2350 cGy. Fourteen of 17 (82.0%) patients showed complete resolution, while 3/17 (18.0%) patients with factor VIII inhibitors also responded to radiotherapy and factor VIII therapy. Krill *et al*²⁵ reviewed eight cases of hemophilic hemarthrosis over a period of seven years and showed that the patient treated with radiotherapy had rapid resolution of tumor without any recurrence. Dose as low as 600 cGy to as high as 2300 cGy with or without factor VIII replacement has shown good response.

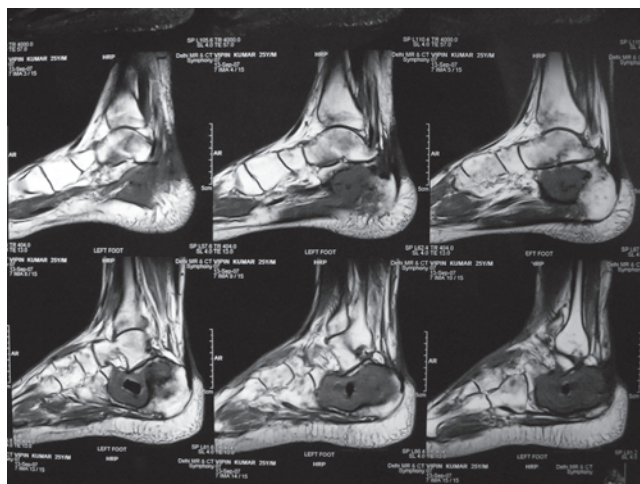


Fig. 6. Post radiotherapy MRI section showing the healed lesion (6 months follow up MRI)

In our case we preferred the combination therapy and the patient was started on factor VIII at dose of 2500 units every 12 hourly, supplemented with cryoprecipitate, regular dressing of the wound and light compression bandage was combined with external radiotherapy for 7 days. A total of 15 Gy/7 days was given and discontinued after a symptomatic relief. Two months clinico-radiological (X-ray) follow up revealed dramatic clinical recovery and 6 months later clinico-radiological (MRI) follow up suggested healed lesion. Now after 2 years of clinical follow up lesion has healed and he is asymptomatic even on full weight bearing.

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Multiple skeletal metastases as unusual manifestations of hepatocellular carcinoma in a noncirrhotic liver

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ABSTRACT

Hepatocellular carcinoma is the most frequent primary malignant tumor of the liver. Bony metastases of hepatocellular carcinoma are usually rare, in which most common sites involved are vertebra and pelvis. Still rarer are metastases to the chest wall and skull. We report a case of a 45-year old man with unusual metastases of hepatocellular carcinoma to skull, sternum and ribs. These combinations of metastases have rarely been reported in literature.

Keywords: Sternal metastases; skull metastasis; osteolytic lesions; aflatoxin B; cirrhosis.

Hepatocellular carcinoma (HCC) is the most frequent primary malignant tumor of the liver.¹ It is usually seen in the sixth and seventh decades of life in the western world, whereas in Asia and Africa, it usually occurs in the fourth decade of life.² It is found more commonly in the males.² A definite association between HCC and cirrhosis has been found, with chronic hepatitis B viral infection being described as the most common cause.³⁻⁵ It has been found to metastasize commonly to the lungs, regional lymph nodes, kidneys, bones and adrenals.⁴⁻⁹ Multiple bony metastases to the skull and the chest wall have rarely been reported before. This report presents a middle aged male with unusual metastasis of HCC which manifested initially as multiple swellings on the mid sternum and anterolateral aspect of the chest wall and the skull.

CASE REPORT

A 45 year old male presented to our hospital with complaints of swelling in the central and right anterolateral region of the chest and the right side of the skull, loss of weight, loss of appetite and general weakness of 3 months duration. There was no history of pain over the swellings, jaundice, fever, night sweats. He was nonalcoholic. His physical examination revealed a 3 × 2 cm fixed hard swelling in the right side of the skull and two hard swellings of varying sizes at the mid sternum and right anterolateral region of the chest. There was no pallor, icterus or ascites. On abdominal examination, he had mild nontender hepatomegaly. He was anemic with hemoglobin of 8.5 mg/dL. Total and direct bilirubin and liver enzymes were within normal limits. Viral marker profile was not reactive for both HBsAg and HCV. Other causes of liver disease were eliminated by assessment of antinuclear, anti-

mitochondrial, anti-smooth-muscle and anti-microsomal antibodies. Iron metabolism study was also normal.

The radiograph of the skull demonstrated an osteolytic lesion involving the right frontal bone. Computerized tomography (CT) of the skull revealed a destructive lesion with erosion of the right frontal bone (Fig. 1). CT scan of the thorax revealed soft tissue lesions on the central and right anterolateral aspect of the chest with erosion of the sternum and right 5th and 6th ribs respectively (Fig. 2). Abdominal CT scan detected a 4.6cm x 4.1cm well circumscribed heterogenous lesion in the right lobe of the liver (Fig. 3). The rest of the liver parenchyma was normal. There was no lymphadenopathy on thoracic, abdominal or pelvic scan. Microscopic examination of the biopsy specimen from the skull and chest wall lesions revealed pleomorphic tumor cells with eosinophilic cytoplasm, prominent nucleoli and mitosis arranged in trabecular and solid



Fig.1. Axial CT scan of the skull (bone window) showing a lytic lesion in the right frontal bone.

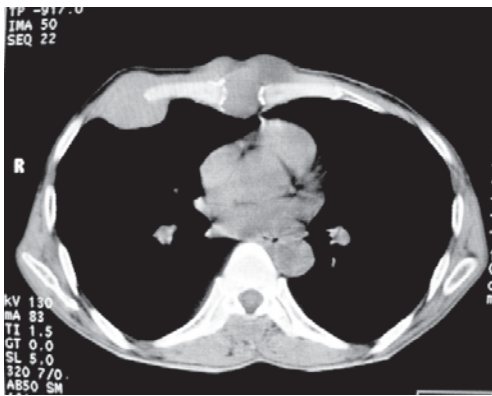


Fig.2. CT scan of the thorax showing lytic lesions involving the sternum and right 5th rib adjacent to the costochondral junction with soft tissue extension.

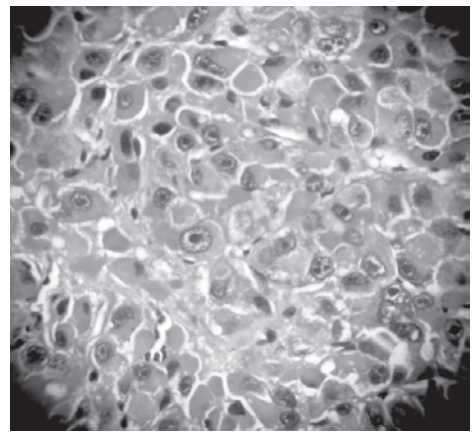


Fig.4. Photomicrograph of the biopsy taken from the chest wall and skull lesions shows malignant hepatocytes, consistent with metastatic hepatocellular carcinoma. (X 400 Haematoxylin and Eosin stain)

pattern, suggestive of metastatic hepatocellular carcinoma (Fig. 4). Cytological examination of a fine needle aspirate taken from the lesion in the liver was consistent with the diagnosis of hepatocellular carcinoma (Fig. 5). The serum alpha-feto protein (AFP) level of the patient was elevated (33,566 ng/mL; normal 0-13.6 ng/ml). The patient was discharged on palliative treatment. After 2 months of diagnosis and 5 months of appearance of the symptoms, he is still continuing with follow-up. No other swellings have appeared, he has weight loss and increase in size of the described swellings.

DISCUSSION

Bony metastases from HCC are now being reported more commonly than ever before. They are seen in 3.0-10.0% of HCC patients.¹⁰⁻¹⁵ The bones most commonly involved are the vertebra, pelvis, ribs and skull.¹⁶ Isolated metastases to the ribs, sternum and the skull have been reported.¹⁷⁻²⁴ Multiple metastases to the chest wall and the skull in the same patient have rarely been reported in the literature.

The bony lesion due to metastatic HCC in this case was osteolytic and discrete. However, multiple osteolytic

lesions simulating multiple myeloma can be due to metastatic HCC.²⁵

The etiology of HCC is still unknown in this patient. There were no clinical or laboratory parameters or radiological features of chronic liver disease. HCC has been found usually to develop on a background of cirrhosis (cirrhomimetic) but can also originate in normal or nincirrhotic hepatic parenchyma (non-cirrhomimetic).²⁶ In fact, in South African black population, 37.0% of primary HCC occurs in patients without cirrhosis.²⁶ One cause that can be attributed is aflatoxin B produced by aspergillus species which grows as a contaminant in stored cereals and grains in a hot humid climate. A close correlation between the degree of fungal contamination and frequency of HCC has been reported in tropical areas like sub-Saharan Africa and South East Asia, though the frequency is less well established in our part of the world, due to lack of studies.^{27,28} We believe such a relation might exist in our patient. Studies using histochemical detection of aflatoxin B in patients with HCC will be needed further to establish the causative role in our region also.

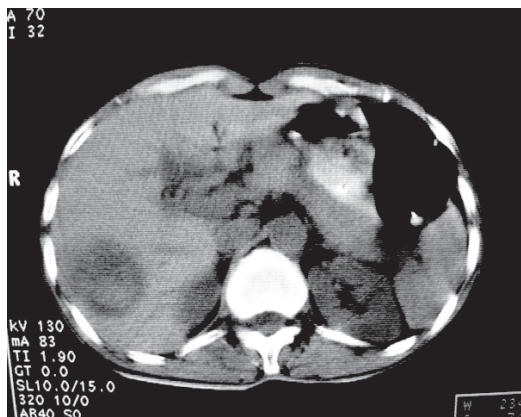


Fig. 3. CT scan of the abdomen showing a well defined heterogeneous mass lesion in the right lobe of the liver.

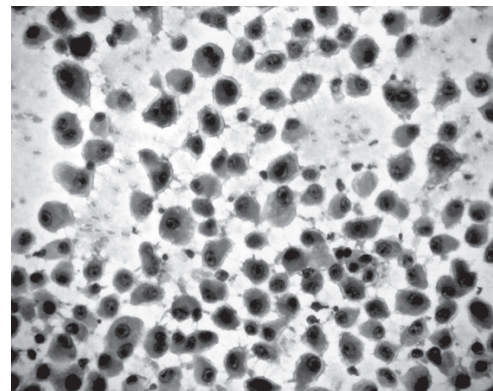


Fig.5. Cytological examination from the lesion in the liver shows malignant hepatocytes, suggestive of hepatocellular carcinoma (X 400 Papanicolaou stain)

Metastatic HCC without an unknown primary is a definite subset that poses a great challenge in the diagnosis.^{17,18,24} The cause has been postulated to be ectopic liver carcinogenesis and hepatoid adenocarcinoma found to occur in the stomach, ovary, uterus, renal pelvis, bladder, pancreas and lungs.^{24,29-31} In our case, there was little difficulty in the detection of the primary which was confirmed by the fine needle aspiration cytology.

We conclude hereby that metastasis of HCC should be included in the differential diagnosis of bony swellings even in the absence of chronic liver disease.

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Adrenal gland teratoma in a 40-year-old woman

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ABSTRACT

Teratoma is a germ-cell tumor that commonly affects the gonads. Extragonadal teratoma is a rare entity. Teratoma in the region of adrenal gland is a rare and uncommon retroperitoneal tumor; only few cases have been reported. This case report describes such a tumor in a 40-year-old-woman who presented with multiple vague complaints. Ultrasonography of the abdomen showed a mixed echogenic mass with areas of calcification in right supra-renal region and a lymph nodal mass in the right renal hilar region. Computed tomography showed a mass containing fat, calcification and soft tissue component in right supra-renal region indenting the superior pole of kidney. Intraoperatively a supra-renal tumor was found within in a pseudocapsule that covered most of the tumor with a part of duodenum fixed to the mass.

CASE REPORT

A 40-year-old female had been visiting different hospital with series of multiple vague complaints like chest pain, headache, excessive fear, dizziness for past 3-4 years. Batteries of tests were carried out such as blood investigations, thyroid function test, renal function test etc. which all yielded negative results. She was then referred to psychiatry department where she was diagnosed to have somatoform disorder and was receiving treatment accordingly. Finally after few months she landed up in our department for ultrasonography as she had presented with pain over left lumbar region and left hypochondrium.

An ultrasound scan showed a mixed echogenic mass with hypoechoic areas and calcifications in right supra renal region with retrocaval extension. The tumor mildly displaced the kidney inferiorly. A lymphnodal mass was also seen at right renal hilum. CT revealed a right suprarenal mass measuring approximately 9x8x5 cm. The mass was mainly fat containing with soft tissue and calcific components. Post- contrast studies showed no particular pattern of enhancement (Fig. 1-2).

In view of the possibility of malignant nature of the tumor such as liposarcoma, the patient underwent laparotomy

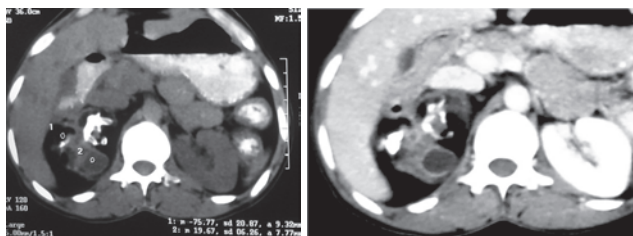


Fig. 1. CT axial section at level of adrenal gland showing heterogeneously enhancing mass lesion containing fat, calcification and soft tissue component

and abdominal exploration. Intraoperatively supra renal mass was found with retrocaval, retro-aortic extension and upto the crux of diaphragm. The mass was also seen fixed to a part of the duodenum.

Histological examination revealed a mature teratoma. Mature adipose tissue, smooth muscle bundles, and glands with mucin production were also noted. Dystrophic Calcification and ossification were seen focally. The adrenal gland was present at the periphery of the tumor. The patient's condition was stable after the operation and was discharged uneventfully.

DISCUSSION

Teratomas are congenital tumors thought to arise from pluripotent embryonal cells.¹ Teratomas can occur in almost any region of the body, but are most commonly found in paraxial and midline locations.² Reports of teratomas in the region of the adrenal gland are rare in literature.³ Lipomatous tumors of the adrenal gland are also not commonly seen. They include lipoma,

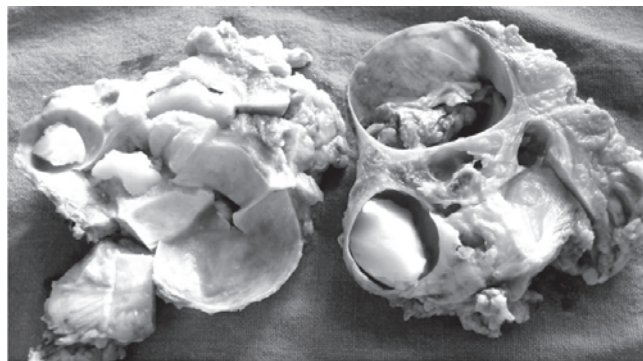


Fig. 2. Cut section of the specimen showing cystic spaces containing pultaceous and mucoïd material with areas of cartilage and bony tissue. Periphery shows compressed adrenal tissue

myelolipoma, teratoma, angiomyolipoma, and liposarcoma.^{4,5} These patients are asymptomatic and often present with non-specific complaints.^{6,7}

Retroperitoneal teratomas are more common during childhood than at other time, and they are rare entity in adults.^{8,9} Malignant change is also more commonly found in adults than in children (26.0% vs 10.0%).^{8,10} Abdominal radiograph may demonstrate mass with fat with either calcification or bone. Similarly, ultrasonography shows uncomplicated fluid and calcification. Fat is not reliably distinguished from other soft tissue components by ultrasonography. CT demonstrates a heterogenous mass containing well-circumscribed fluid component of variable volume, adipose tissue or sebum in form of fat-fluid level, and calcification.¹¹ MRI may demonstrate the characteristic signal of fat (hyperintensity) and water (hypointensity) in T1-weighted images.

The presence of calcification is more common in teratomas than in other lipomatous tumours. Calcification in myelolipomas is not as common as in teratomas.¹² The presence of calcification in adrenal lipomas is also an uncommon finding. CT images of angiomyolipoma demonstrate mainly fatty component and tiny soft tissue densities interspersed within the tumor. Calcifications are also rare in angiomyolipomas.

Liposarcoma is most common adult form of soft tissue sarcoma and may present on CT imaging with cystic, muscle, or fat density.

The 40-year-old lady in our case had an incidental finding of retroperitoneal lipomatous tumor in which the possibility of malignancy, such as liposarcoma, could not be excluded. Surgical resection was thus performed and histopathological report confirmed it as teratoma. Primary retroperitoneal teratoma is unusual in patients above the age of 30 years; only 10.0% have been reported

to occur after that age.¹³ Incidental finding of teratoma occurring in the region of adrenal gland in a 77-year-old man has also been reported.¹⁴ Thus teratoma should be considered in differential diagnosis of adrenal lipomatous tumours – in all age groups.

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